



A.D. 1841 . . . . . N° 8820.

S P E C I F I C A T I O N

OF

JOHN MANBY.

REVERBERATORY FURNACES.

L O N D O N :

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## Reverberatory Furnaces.

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### SCHAFHÖUTL, MANBY, AND MANBY'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOHN MANBY, of Parliament Street, in the City of Westminster, Civil Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Thirtieth day of January, in the fourth year of Her reign, did give and grant unto Charles Schafhöutl, of Munich, in the Kingdom of Bavaria, then and now residing at Swansea, in the County of Glamorgan, Doctor of Medicine, Edward Oliver Manby, of Parliament Street aforesaid, Civil Engineer, and me, the said John Manby, our exors, admors, and assigns, Her special license, full power, sole privilege and authority, that they, the said Charles Schafhöutl, Edward Oliver Manby, and I, the said John Manby, our exors, admors, and assigns, and every of them, and such others as we, the said Charles Schafhöutl, Edward Oliver Manby, and John Manby, our exors, admors, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick upon Tweed, their Invention of "IMPROVEMENTS IN THE CONSTRUCTION OF PUDDLING, BALLING, AND OTHER SORTS OF REVERBERATORY FURNACES, FOR THE PURPOSE OF ENABLING ANTHRACITE, STONE COAL, OR CULM TO BE USED THEREIN AS FUEL;" in which said Letters Patent there is contained a proviso that the said Charles Schafhöutl, Edward Oliver Manby, and John



*Schafhäutl, & E.O. & J. Manby's Improvements in Reverberatory Furnaces, &c.*

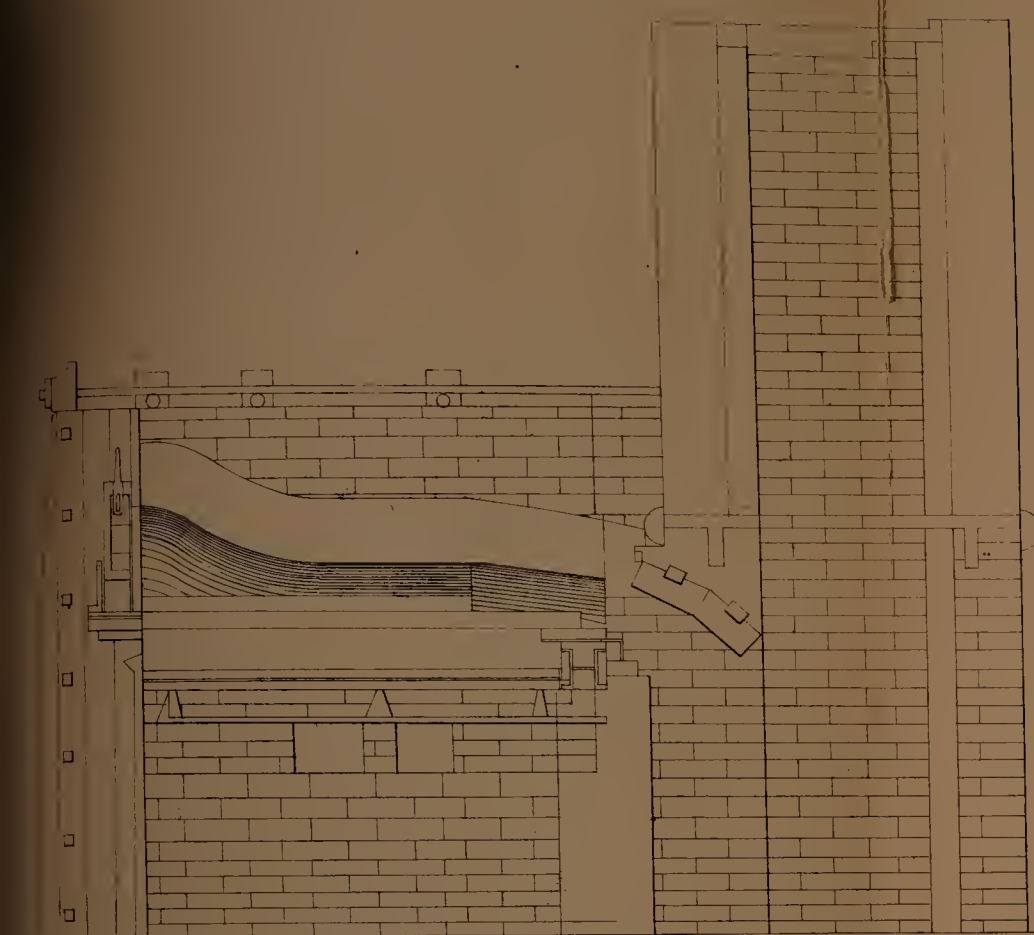
Manby shall cause a particular description of the nature of their said Invention, and in what manner the same is to be performed, by an instrument in writing under their hands and seals, or under the hand and seal of one of them, to be enrolled in Her said Majesty's High Court of Chancery within six calendar months next immediately after the date of the said in part 5 recited Letters Patent, reference being thereunto had, may more fully and at large appear.

**NOW KNOW YE**, that in compliance with the said proviso, I, the said John Manby, do hereby declare the nature of my Invention, and the manner in which the same is to be performed, are particularly described and ascer- 10 tained in and by the following description thereof, reference being had to the Drawing hereunto annexed, and to the figures and letters marked thereon (that is to say) :—

Reverberatory furnaces, as at present constructed, consist of a single fire- place at the extremity opposite the chimney, by which disposition the flames 15 are made to pass from the fire over the substances to be acted upon to the chimney in one direction only, and our improvements consist in surrounding the substances to be acted on by the fire and flames (except at such places as are necessary for the introduction of the substances themselves and the tools for working them, and for the eduction of the flames or products of com- 20 bustion from the furnace to the stack or chimney,) in such manner as that the flames and products of combustion are made to act on the substances in the furnace from all sides, instead of from one point only, by which means anthracite or stone coal and culm, and other short-flamed fuels that heretofore have been considered inapplicable to the process, may be used, as well as 25 bituminous coal and other long-flamed fuels.

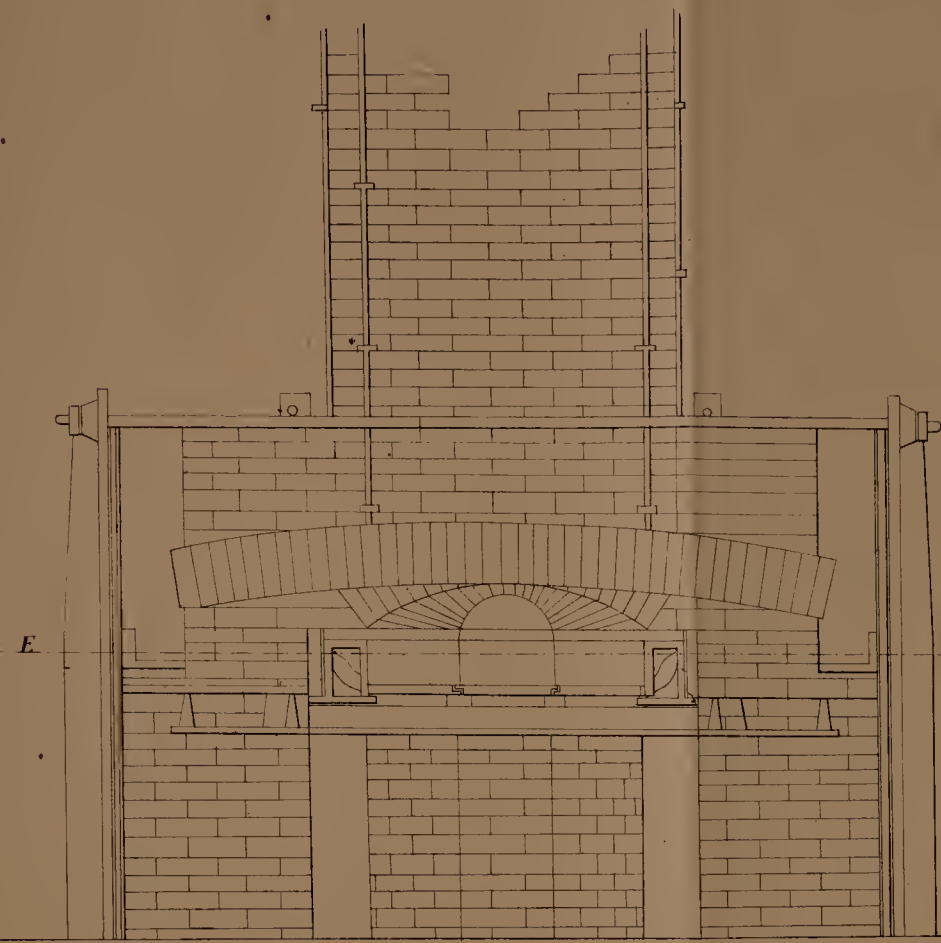
In order that the Invention may be more fully understood, I shall describe it with reference to the Drawing, which contains plans and sections of a furnace constructed on the principles of our Invention. Figure No. 1 represents a longitudinal section through the centre of the furnace; No. 2 is 30 a transverse section, also through the centre of the furnace; and No. 3, a sectional plan above the puddling hearth or bottom. It will be seen, by reference to these three sections, that instead of the usual single fire-place or grate, as in the reverberatory furnace as at present constructed, our fire-place or grate surrounds the working hearth or bottom, on which the metals, ores, or 35 other substances to be acted on are placed, except only where interrupted by the working door and the canal leading to the chimney, the one being placed opposite to the other. By this disposition the ores or metals introduced into the furnace are acted on by the heat and flames from all sides, instead of from





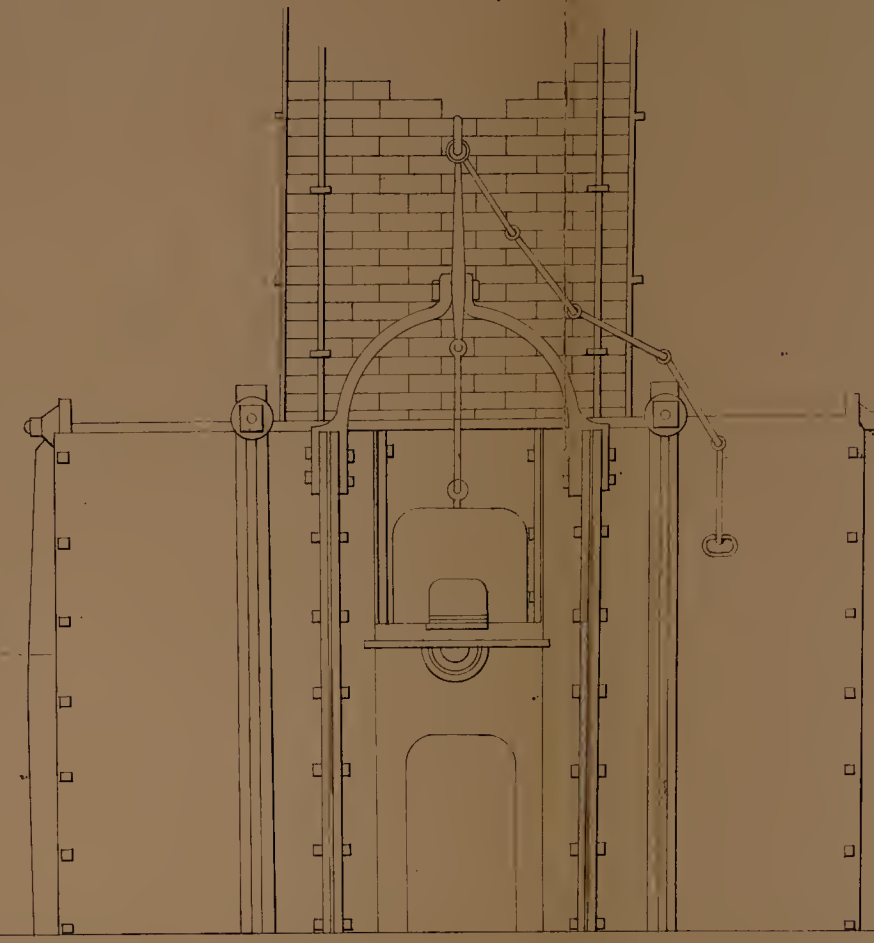
N° 1.

*Longitudinal Section, through the centre of the Furnace, according to the line A.B.*



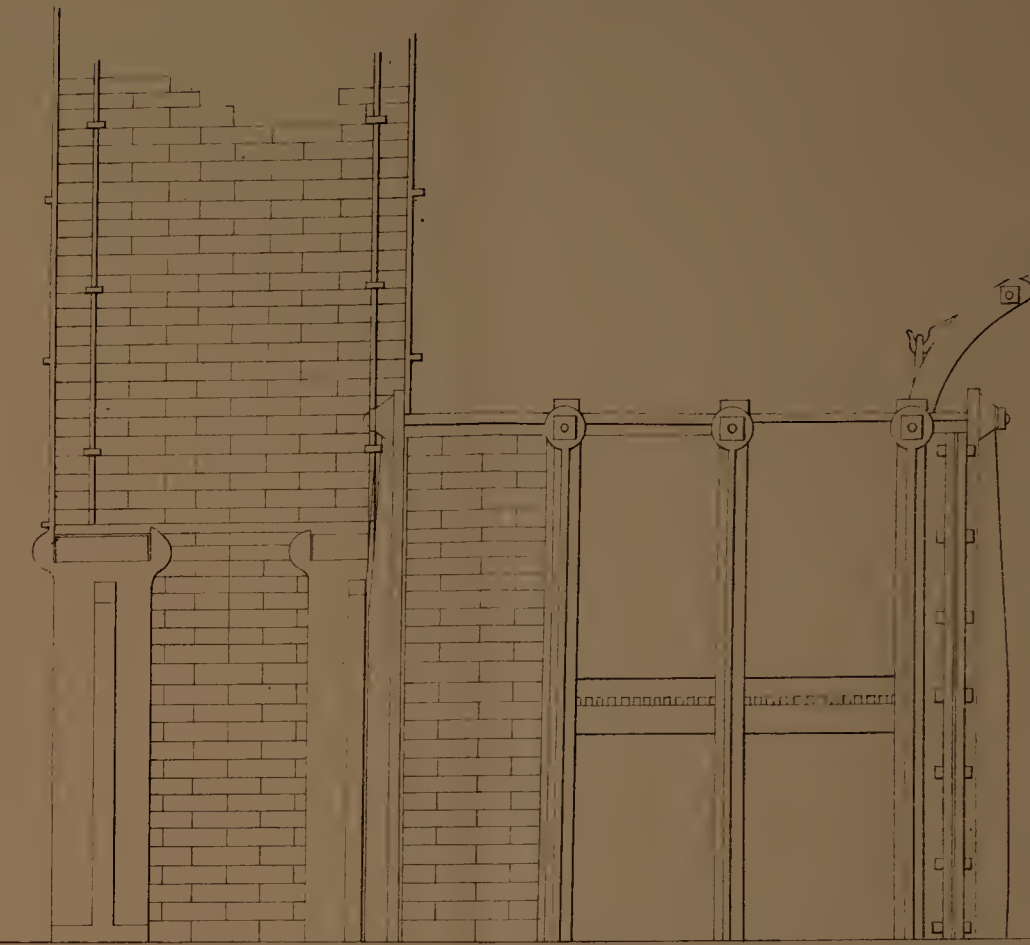
N° 2.

*Transverse Section, also through the centre of the Furnace, on the line C.D.*



N° 4.

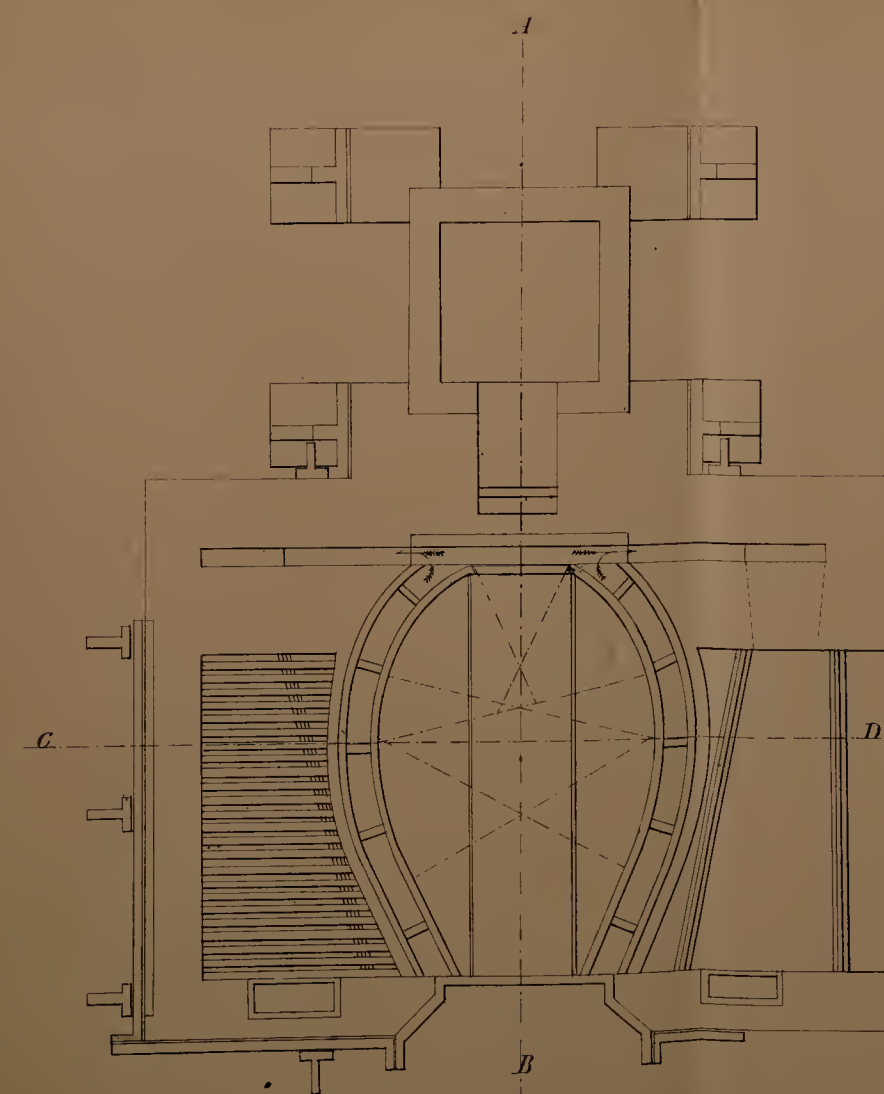
*Front View.*



N° 5.

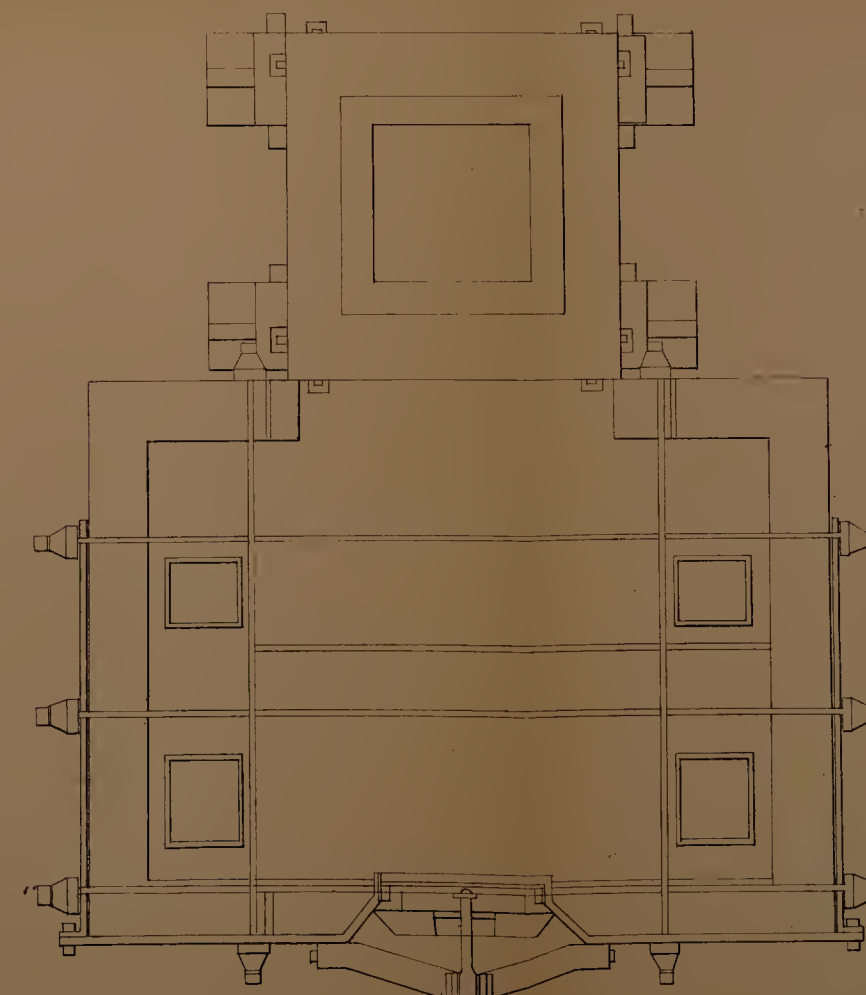
*Side View.*

*Scale  $\frac{1}{2}$  Inch = 1 Foot.*



N° 3.

*Sectional Plan on the line E.F. shewing the Puddling hearth or bottom.*



N° 6.

*Top View.*





*Schafhœutl, & E.O. & J. Manby's Improvements in Reverberatory Furnaces, &c.*

one side only, as in reverberatory furnaces of the present known construction, and by it fuels giving out shorter and less flames than bituminous coal, such as anthracite or stone coal or culm, may be advantageously and effectually used for all purposes to which reverberatory furnaces are at present applied. In  
5 other respects this furnace does not essentially differ from those now in use. No. 4 represents a front view, shewing the working door; No. 5, a side view of the furnace; and No. 6, a top view, shewing openings to be used when anthracite or stone coal or culm is employed as the fuel for the purpose of supplying the fire-places, as it will be found convenient and economical (although  
10 not essential) to place the anthracite or stone coal or culm on the reverberatory arch to heat it prior to its use, in order to prevent the decrepitation which is known to take place when this fuel is suddenly submitted to a high temperature. The Drawing subjoined to this Specification represents more particularly what is termed a boiling furnace, in which iron is puddled without  
15 being previously refined in the finery fire. It is provided with hollow sides and back, in which a circulation of air is allowed or maintained. Our improvements, however, are equally applicable to furnaces working in fine metal, to those which are only used for foundry purposes, or to those used for the reduction of ores, such as copper, and other furnaces; in short, to every  
20 kind of reverberatory furnace. Either cold or heated air may be used; if cold, the ash-pits are left open, as in the Drawing; if heated, these should be closed, and converted into warm air chambers or reservoirs. In this latter case we admit the air by the opening under the working door, pass one portion through the hollow sides and back, and the remainder by  
25 channels built round the stack or chimney, from whence it passes to the ash-pits, so that the air is heated partly by the hollow sides, partly by the heat passing away through the chimney, and partly by the radiation which takes place in the ash-pits themselves. We have hitherto found this the most advantageous manner of working, and we consequently recommend it; but at  
30 the same time any other method of heating the air may be resorted to, or the furnace worked with cold air. We do not make this an essential part of our Patent. A draft may be created by a stack or chimney, or a forced blast may be used. When anthracite, stone coal, or culm is used we recommend a rather stronger draft than is usually used in puddling with bituminous coal.

35 Having thus described the nature of our Invention, and the manner of carrying the same into effect, we claim as our improvements the surrounding of the metals, ores, or other substances in the puddling, balling, or other reverberatory furnaces by the fire and flames by means of a furnace constructed on the plan or principles of the furnace herein-before described, the dimensions



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*Schafhœutl, & E. O. & J. Manby's Improvements in Reverberatory Furnaces, &c.*

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and details of which may be varied according to circumstances, as is the case with the reverberatory furnaces now in use. And we claim this particularly as a mode of rendering available in reverberatory furnaces anthracite or stone coal and culm or other short-flamed fuels, as well as bituminous coal or other long-flamed fuels, heretofore in use. 5

In witness whereof, I, the said John Manby, have hereunto set my hand and seal, this Thirtieth day of July, One thousand eight hundred and forty-one.

JOHN (L.S.) MANBY.

WILSON. AND BE IT REMEMBERED, that on the Thirtieth day of July, in the 10 year of our Lord 1841, the aforesaid John Manby came before our said Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose. 15

Inrolled the Thirtieth day of July, in the year of our Lord One thousand eight hundred and forty-one.

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